UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,577	02/08/2006	Kai Schumacher	284805US0X PCT	2526

22850 7590 12/07/2009
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
ZIMMER, ANTHONY J	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
12/07/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/567,577	SCHUMACHER ET AL.	
	Examiner	**Art Unit**	
	ANTHONY J. ZIMMER	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-6,8-12,14,16,17,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-6, and 8-12, 14, 16-17, and 19-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 4-6, and 8-12, 14, 16-17, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'271 (Great Britain 1197271) in view of Mangold '944.

In regard to claims 1 and 4, GB'271 teaches a process of purifying finely divided metal oxide particles formed by reaction of chlorides of the metals by hydrolytic or oxidizing gasses. See page 2, lines 56-72. Adding metal oxide particles containing hydrogen chloride and chlorine (residues of halide compounds), see page 1, lines 38-45, together with waste (reaction) gasses (as indicated by the design choice to widen the reaction tube in response to the entrance of these gasses, see page 3, lines 1-7), to the top of a vertical reaction tube (column) in which the metal oxide falls due to gravity

against a mixture of steam (a counter-current feed); see page 2, lines 56-72; the purified metal oxides being removed at the bottom of the column and the steam containing the halide residues are removed at the head (top) of the column; see page 3, lines 1-7 and 35-39. GB'271 teaches a temperature of 400-600°C. See page 1, lines 60-64. Overlapping ranges are *prima facie* obviousness. See MPEP 2144.05. GB'271 teaches steam of 120°C. See page 2, lines 66-70.

GB'271 is silent in regard to the temperature difference between the bottom and the top of the column and the residence time of the particles.

In regard to the residence time, GB'271 does not indicate the density of the silicon dioxide used, which is needed to calculate the residence time. However, in Table 2 of Mangold, silicon dioxides produced by flame hydrolysis like the silica used in Example 1 of GB'271 and having similar surface areas to those used in Example 1 of GB'271 have densities in the range of 25-32 g/L; thus the density of the silicon dioxide used in GB'271 would necessarily fall in this range; corresponding to a residence time of 2.9 - 3.7 minutes, according to the reaction parameters in GB'271 Example 1.

Basis of calculation: (density of reactant)(volume of reactor)/

(rate of feed of reactant) = residence time

Furthermore, it would have been obvious to one of ordinary skill in the art to use the silicon dioxide particles of Mangold in the process of GB'271, if the density presented is not already inherent, because GB'271 teaches using metal oxide particles from a flame hydrolysis process (See page 1, lines 25-30), and Mangold is such a flame hydrolysis process producing silicon dioxide particles.

In regard to the temperature difference, GB’271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300L tube used in Example 1, and with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom of at least 20°C would necessarily be produced. Furthermore, the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result.

In regard to claim 2, GB’271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300L tube used in Example 1, with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom as required by claim 2 would necessarily be produced. Furthermore, the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result. In regard to claim 2, the upper limit of the temperature difference, it would have been obvious to one of ordinary skill in the art to optimize the temperature profile in the column in order to provide an upper limit in order to prevent undesirable

effects on the product and in order to increase the safety of the reactor as sharp gradients within a reactor promote instability and produce undesirable results in the product.

In regard to claim 5, GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, it would have been obvious to one of ordinary skill in the art to preheat the particles in order to shorten residence time and reactor volume. The particular temperature chosen is a matter of design choice and routine optimization that fails to produce an unexpected result.

In regard to claim 6, GB'271 teaches 12.5 Nm^3 of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m^3 (engineeringtoolbox.com). Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg(/hr) per kg of metal oxide particles.

In regard to claims 8, 9, and 10, GB'271 does not teach plural columns. However, depending on the desired quality of the product, the quality of the provided crude metal oxide particles, and the efficiency of the purification process, it would have been obvious to one of ordinary skill in the art to subject the metal oxide particles to a second purification process (i.e. passing the silica particles through another column), with the same conditions as the first, see claim 1 rejection above, in order to achieve the predictable result of producing a purer product.

In regard to claim 11, see above for the limitations of claim 2, GB'271 teaches a reactor temperature of 400-600°C. See page 2, lines 96-99. Overlapping ranges are prima facie obviousness. See MPEP 2144.05.

For the limitations of claim 12, see above for the limitations of claim 2; see claim 1 rejection above in regard to residence time.

In regard to claims 14 and 16, see above for the limitations of claim 2, 3, or 4. GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, the particles provided to the deacidification process are from a flame hydrolysis or oxidizing process, high temperature processes (see page 1, lines 10-51 of GB'271). It would have been obvious to one of ordinary skill in the art after the hydrolysis or oxidizing process, to keep the metal oxide particles at a temperature near the operation temperature of the purification column (400-600°C) in order to affect the predictable result of decreasing the energy demand of the purification column and thus the cost.

In regard to claims 17, and 19-20, see above for the limitations of claim 2, 4, or 5. GB'271 teaches 12.5 Nm^3 of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m^3. Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg(/hr) per kg of metal oxide particles.

Response to Arguments

Applicant's arguments filed 8/11/2009 have been fully considered but they are not persuasive.

Applicant argues that the treatment temperature in GB'271 is 400-600°C. However, this range overlaps applicant's claimed ranges of 150-500°C and 350-450°C. Overlapping ranges are *prima facie* obviousness. Supra.

Applicant argues that GB'271 does not teach or suggest a temperature difference between the bottom and the top of the column of 20-150°C or 50-100°C or a maximum temperature in the bottom portion of the reactor and instead one of ordinary skill in the art would expect the temperature in the reactor of GB'271 to be constant throughout the volume.

This was found to be unpersuasive because applicant has not established that a constant temperature would exist throughout the volume in the reactor of GB'271. To the contrary it is expected that a temperature differential would exist. GB'271 teaches heating the reactor with internal hydrogen burners or external resistance-based heater located at the bottom of the reactor. Thus, it would be expected that the maximum temperature in the reactor would be nearest the heat source in the bottom portion of the reactor. Further, it is expected that in a reactor the size of that used in GB'271 (i.e., 300L) the temperature immediately next to a heat source (particularly a hydrogen burner) would be different from the lowest temperature in the reactor (in the top of the reactor) by a temperature within the wide range instantly claimed.

Applicant points to several locations in GB'271 where the reaction temperature is mentioned. However, these citations do not establish or even discuss the temperature profile of the reactor and most likely reflect an average temperature or the temperature taken at one location.

It is also noted that attorney arguments cannot take the place of evidence in showing unexpected results or the inoperability of the prior art. To be of probative value, any objective evidence should be supported by actual proof. See MPEP 716.01(c).

Applicant argues that it would not have been obvious to one of ordinary skill in the art to optimize the temperature profile because first a parameter must be recognized as a result effective variable in order to be optimized.

However temperature and the temperature profile of a reactor are matters routinely optimized in the chemical art in order to improve efficiency and energy usage and thus are well established critical variables. For instance, attached Chapter 6 of Chemical Reactor Design, Optimization, and Scaleup discusses temperature optimization and particularly mentions the entrance and exit temperatures.

In regard to applicant's request that the examiner separately consider claim 11, the examiner has done so and finds the claim to be unpatentable for the same reasons elaborated above.

Applicant argues unexpected results by pointing to Example 2 in the instant specification and pointing to the improved viscosity of the instant products. (Applicant's arguments page 13, second full paragraph).

However this was found to be unpersuasive because instant Example 2 does not correspond to the process of GB'271. In order to show unexpected results applicant must compare the closest prior art and the instant claims must be commensurate in scope with the showing. See MPEP 716.02(b).

Applicant argues that it would not have been obvious to one of ordinary skill in the art to pass the metal oxide particles of GB'271 through multiple treatment columns. This was found to be unpersuasive because generally in the chemical art, especially in purification processes, the repetition of a purifying step in order to further purify a

product would have been obvious to one of ordinary skill in the art in order to purify the product and produce a higher quality product. Further, reactors are often used in series to complete a reaction in response to space limitations.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz

/Steven Bos/
Primary Examiner, Art Unit 1793